Engineering Physics Lab Report 3

Experiment 3: Hooke's Law

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19th of May 2010

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Objective

To verify Hooke's Law.

Learning outcome

Upon the completion of the experiment, the student will be able to find the spring constant k by applying the Hooke's Law

Apparatus

1. Spiral spring

2. Stands and clamps

3. Meter or half-meter rule

4. Slotted masses and hanger (or scale pan and masses)

Procedure

1. Suspend the spring so that it hangs vertically form a rigid support and to the lower end attached to the first of the slotted masses.

2. Clamp the scale clerically alongside the spring so that a small pointer of flag attached to the spring moves lightly against the scale.

3. If the apparatus is not provided with a pointer one can easily be improvised by folding a piece of gummed paper round the straight portion of the spring and cutting it to the necessary shape or alternatively sticking a needle by means of sellotape or plastecine to the underside of the first weight

4. Record the reading of the first pointer and the mass attached to the spring.

5. Increase the load by successive increments of 50 f and record the pointer reading each time when about ten such reading have been and before the spring has stretched to more than double its original

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unloaded length start unloading the masses again and record the pointer readings.

Theory and calculation

The graph that I will attach with this report will probably be of the shape shown in the diagram and the first conclusion to be drawn is that though most points lie on the straight t line not all of them do and therefore the total extension of the spring is not proportional to the total load producing it .However, for the straight line portion of the graph it is seen that any increase QN in the load is proportional to the extension PN it produces which is Hooke's Law.

Result

Load/g	Pointer reading /cm			Extension
	Load increasing	Load decreasing	Mean reading	
0	45	45	45	0
100	47	46	46.5	0.5
200	49	50	49.5	0.5
300	67	67	67	0
400	87	93	90	3
500	106	-	106	0
0	47	47	47	0
100	49	48	48.5	0.5
200	50	49	49.5	0.5
300	51	50	50.5	0.5
400	52	52	52	0
500	53	-	53	0

$k = $ QN / PN x 10^{-1} g in Nm^{-1}

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Discussion

Drawing as lab manual showed doesn't give me the right graph, so I will plot a graph and will change the vertical axis instead of pointer reading into extension, and that will probably give me the right graph.

Conclusion

I applied the rule that state that F=-k(x) and that means that the force of the spring equals Hook's constant multiply (x) which means the distance .

A graph shows the Black Spring   A graph shows the Blue Spring
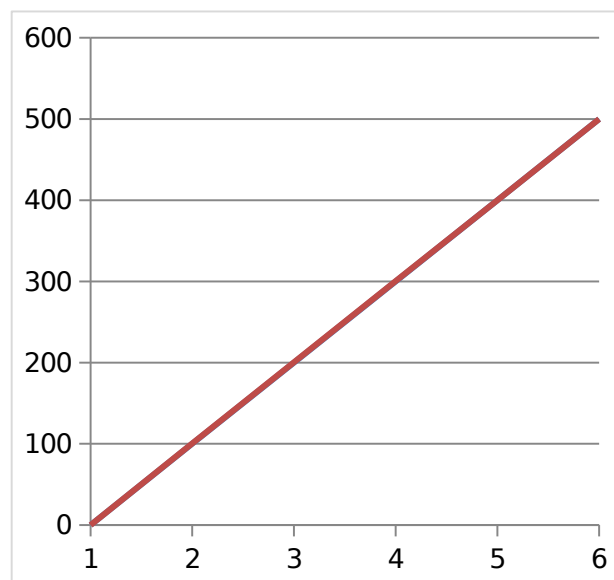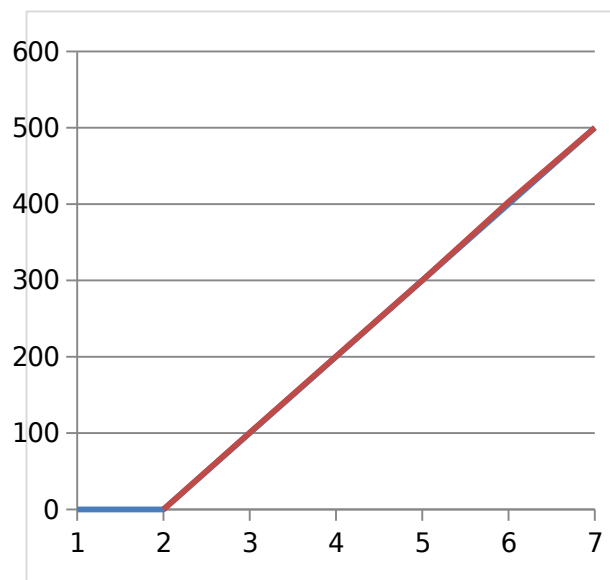
Here the black spring is similar to the graph that is in the lab manual.

K= 6.1/6.4 = 0.9 x 10^{-1} g in Nm^{-1}